

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A method of generating object region data relating to an object region in at least three frames of moving picture, the at least three frames lined up in a time-series variation, the method comprising:

generating a polygon approximating a contour of the object region in each of the at least three frames, the polygon having vertexes;

associating each of the vertexes in each of the frames with each of the same vertexes in an adjacent frame;

obtaining trajectories, each of the trajectories linking the same vertexes through the at least three frames based on the time-series variation of the at least three frames; and

generating the object region data, the object region data comprising an approximate function data expressing ~~based on~~ the trajectories.

Claim 2 (Currently Amended): The method according to claim 1, wherein each of the vertexes in each of the at least three frames are associated with each of the same vertexes in the adjacent frame such that a distance between each of the vertexes in each of the at least three frames and each of the same vertexes in the adjacent frame is minimum.

Claim 3 (Currently Amended): The method according to claim 2, wherein the distance between each of the vertexes in each of the at least three frames and each of the same vertexes in the adjacent frame is calculated after a center of gravity of the polygon in each of the at least three frames coincides with a center of gravity of the polygon in the adjacent frame.

Claim 4 (Previously Presented): The method according to claim 2, wherein the trajectories are respectively approximated by predetermined functions, and the object region data is generated by using the functions.

Claim 5 (Currently Amended): The method according to claim 2, wherein the object region data includes position data of the vertexes of each of the at least three frames and association data indicting correspondence of the vertexes between the frames.

Claim 6 (Previously Presented): A method according to claim 1, wherein the associating each of the vertexes with each of the same vertexes comprises estimating vertexes in the adjacent frame based on the trajectories, and selecting the vertexes in the adjacent frame, that are closest to the estimated vertexes.

Claim 7 (Previously Presented): The method according to claim 6, wherein the trajectories are respectively approximated by predetermined functions, and the object region data is generated by using the functions.

Claim 8 (Currently Amended): The method according to claim 6, wherein the object region data includes position data of the vertexes of each of the at least three frames and association data indicting correspondence of the vertexes between the frames.

Claim 9 (Currently Amended): The method according to claim 1, wherein the associating each of the vertexes with each of the vertexes comprises obtaining a characteristic quantity of the vertexes of each of the at least three frames and associating the vertex in each

of the frames and the same vertex in the adjacent frame which have the closest characteristic quantity.

Claim 10 (Previously Presented): The method according to claim 9, wherein the trajectories are respectively approximated by predetermined functions, and the object region data is generated by using the functions.

Claim 11 (Currently Amended): The method according to claim 9, wherein the object region data includes position data of the vertexes of each of the at least three frames and association data indicting correspondence of the vertexes between the at least three frames.

Claim 12 (Currently Amended): A method of generating object region data relating to an object region in moving picture data having ~~a plurality of~~ at least three frames, the method comprising:

generating a polygon approximating a contour of the object region in ~~several~~ the at least three frames, the polygon having vertexes;

associating each of the vertexes in each of the ~~several~~ at least three frames with each of the same vertexes in an adjacent frame;

obtaining trajectories, each of the trajectories linking the same vertexes through the ~~several~~ at least three frames;

estimating positions of vertexes of a polygon in a next frame based on the trajectories, the next frame following a last frame of the at least three frames for which the trajectories are obtained;

moving the position-estimated vertexes in accordance with a contour of the object region in the next frame;

updating the trajectories by associating each of the moved vertexes with trajectories linking the vertexes which are the same as the moved vertexes; and  
generating the object region data, the object region data comprising an approximate function data expressing ~~based on~~ the updated trajectories.

Claim 13 (Previously Presented): The method according to claim 12, wherein the trajectories are respectively approximated by predetermined functions, and the object region data is generated by using the functions.

Claim 14 (Currently Amended): The method according to claim 12, wherein the object region data includes position data of the vertexes of each of the at least three frames and association data indicting correspondence of the same vertexes between the at least three frames.

Claim 15 (Canceled).

Claim 16 (Currently Amended): An apparatus for generating object region data relating to an object region in at least three frames of moving picture, the at least three frames lined up in a time-series variation, the apparatus comprising:

an approximation unit configured to generate a polygon approximating a contour of the object region in each of the at least three frames, the polygon having vertexes;

an association unit configured to associate each of the vertexes in each of the frames with each of the same vertexes in an adjacent frame;

a trajectory obtaining unit configured to obtain trajectories, each of the trajectories linking the same vertexes through the at least three frames based on the time-series variation of the at least three frames; and

an object region data generation unit configured to generate the object region data, the object region data comprising an approximate function data expressing based on the trajectories.

Claim 17 (Currently Amended): The apparatus according to claim 16, wherein the association unit associates each of the vertexes in each of the at least three frames with each of the same vertexes in the adjacent frame such that a distance between each of the vertexes in each of the at least three frames and each of the same vertexes in the adjacent frame is minimum.

Claim 18 (Previously Presented): The apparatus according to claim 16, wherein the association unit comprises an estimation unit configured to estimate vertexes in the adjacent frame based on the trajectories and a selector configured to select the vertexes in the adjacent frame, that are closest to the estimated vertexes.

Claim 19 (Currently Amended): The apparatus according to claim 16, wherein the association unit is configured to obtain a characteristic quantity of the vertexes of each of the at least three frames and to associate the vertex in each of the frames and the same vertex in the adjacent frame which have the closest characteristic quantity.

Claim 20 (Currently Amended): An apparatus for generating object region data relating to an object region in moving picture data having ~~a plurality of~~ at least three frames, the apparatus comprising:

an approximating unit configured to generate a polygon approximating a contour of the object region in ~~several~~ the at least three frames, the polygon having vertexes;

an association unit configured to associate each of the vertexes in each of the ~~several~~ at least three frames with each of the same vertexes in an adjacent frame;

a trajectory unit configured to obtain trajectories, each of the trajectories linking the same vertexes through the ~~several~~ at least three frames;

an estimation unit configured to estimate positions of vertexes of a polygon in a next frame based on the trajectories, the next frame following a last frame of the at least three frames for which the trajectories are obtained;

a moving unit configured to move the position-estimated vertexes in accordance with a contour of the object region in the next frame;

an updating unit configured to update the trajectories by associating each of the moved vertexes with trajectories linking the vertexes which are the same as the moved vertexes; and

an object data generation unit configured to generate the object region data, the object region data comprising an approximate function data expressing based on the updated trajectories.

Claim 21 (Canceled).

Claim 22 (Currently Amended): An article of manufacture comprising a computer usable medium having computer readable program code means embodied therein, the

computer readable program code means generating object region data relating to an object region in at least three frames of moving picture, the at least three frames lined up in a time-series variation, the computer readable code means comprising:

first computer readable program code means for causing a computer to generate a polygon approximating a contour of the object region in each of the at least three frames, the polygon having vertexes;

second computer readable program code means for causing the computer to associate each of the vertexes in each of the frames with the same vertexes in an adjacent frame of each of the frames;

third computer readable program code means for causing the computer to obtain trajectories, each of the trajectories linking the same vertexes through the at least three frames based on the time-series variation of the at least three frames; and

fourth computer readable program code means for causing the computer to generate the object region data, the object region data comprising an approximate function data expressing based on the trajectories.

Claim 23 (Currently Amended): The article of manufacture according to claim 22, wherein the second computer readable program code means causes the computer to associate each of vertexes in each of the at least three frames with each of the same vertexes in the adjacent frame such that a distance between each of the vertexes in each of the at least three frames and each of the same vertexes in the adjacent frame is minimum.

Claim 24 (Previously Presented): The article of manufacture according to claim 22, wherein the second computer readable program code means causes the computer to estimate

trajectories, and select the vertexes in the adjacent frame, that are closest to the estimated vertexes.

Claim 25 (Currently Amended): The article of manufacture according to claim 22, wherein the second computer readable program code means is configured to obtain a characteristic quantity of the vertexes of each of the at least three frames and to associate the vertex in each of the frames and the same vertex in the adjacent frame which have the closest characteristic quantity.

Claim 26 (Currently Amended): An article of manufacture comprising a computer usable medium having computer readable program code means embodied therein, the computer readable program code means comprising:

first computer readable program code means for causing a computer to generate a polygon approximating a contour of the object region in ~~several~~ at least three frames, the polygon having vertexes;

second computer readable program code means for causing the computer to associate each of the vertexes in each of the ~~several~~ at least three frames with each of the same vertexes in an adjacent frame;

third computer readable program code means for causing the computer to obtain trajectories, each of the trajectories linking the same vertexes through the ~~several~~ at least three frames;

fourth computer readable program code means for causing the computer to estimate positions of vertexes of a polygon in a next frame based on the trajectories, the next frame following a last frame of the at least three frames for which the trajectories are obtained;



fifth computer readable program code means for causing the computer to move the position-estimated vertexes in accordance with a contour of the object region in the next frame;

sixth computer readable program code means for causing the computer to update the trajectories by associating each of the moved vertexes with trajectories linking the vertexes which are the same as the moved vertexes; and

seventh computer readable program code means for causing the computer to generate the object region data, the object region data comprising an approximate function data expressing based on the updated trajectories.

Claim 27 (Canceled).